U.S. ARMY TECHNICAL CENTER FOR EXPLOSIVES SAFETY

EXPLOSIVES SAFETY

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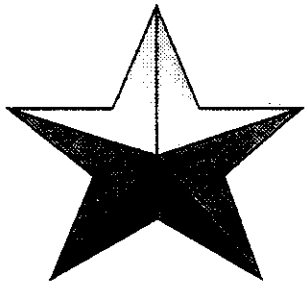

FROM THE DIRECTOR OF ARMY SAFETY

Our explosives safety program is based on Army Regulation 385-64. This regulation provides force protection guidance for commanders with an ammunition and/or explosives mission. It sets explosives safety standards to protect military and civilian Army employees, the public, facilities, equipment, and the environment.

During the Savanna Army Depot Activity (SVDA) Safety, Security, and Wellness Awareness Program (SSWAP), 10 September 1997, I stated that "People make safety happen". As the Director of Army Safety (DASAF), I want to give you the tools necessary to be safe in all phases of your life - at work, at home, and at recreation. I want to develop a closer relationship between the U.S. Army Safety Center (USASC) and the explosives safety business, the occupational health business, and the environmental business. I will go out to pull others into the business, because I believe this is important to the overall mission of the Army.

Explosives safety is a critical part of the Army Safety Program. We have had a very good record in the explosives safety area and we need to continue to strive to improve our safety record. Whenever we experience an incident, people are often killed, disabled, or severely injured. The loss of a single person is tragic.

The task of providing a safe and healthful workplace is one that requires a dedicated effort from everyone. This includes not only supervision and employees at the first level, but every manager and technical support person. Workplace safety and health program, especially when explosives and other hazardous materials are involved, must be in-depth and the result of good planning and execution. Halfway measures have no place in a program that deals with the safety and well-being of our work force.

The task of keeping a solid Army Safety Program in effect is not mine alone. Each of you own a share of the program and you must execute that share with skill and dedication on a day-to-day basis. Nothing short of a total team effort will do, and I will do everything I can to make that team effective.

BURT S. TACKABERRY
Brigadier General, GS
Director of Army Safety

Words from the New Associate Director

As the new Associate Director for the U.S. Army Technical Center for Explosives Safety (USATCES), I am looking forward to the challenges and opportunities we face in explosives safety. We must stay current as we are faced with downsizing of the infrastructure and our changing civilian and military missions.

The need to train our troops; protect the environment; and to maintain, store, demil, and transport our ammunition safely, challenges us to stay focused on the opportunities which exist through testing and technology. The USATCES is involved with the Army Explosives Safety Test Management Program. This program challenges safety standards through testing to validate, establish, or modify (VEM) existing policy as it applies to specific operations. The goal is to improve operational capability and capacity without reducing safety.

The USATCES Explosives Safety Bulletin is a tool for sharing information with the explosives safety community. I actively solicit your ideas and encourage you to submit topics for future publications.

I look forward to working with you now and in the future.

Mr. Johnnie L. Cook, Associate Director, Technical Center for Explosives Safety, DSN 585-8919, email: sioac-es@dac-emh1.army.mil

Happy Anniversary USATCES

February 1998 marks the "official" 10th anniversary of the current U.S. Army Explosives Safety Program, and along with it, the U.S. Army Technical Center For Explosives Safety (USATCES). In February 1988 the Director of the Army Staff (DAS) approved the Explosives Safety Concept Plan which included the charters for the USATCES and the Department of the Army Explosives Safety Council (DAESC).

The USATCES actually predates that anniversary by several months. It was originally organized by Mr. John L. Byrd, Jr., with a directed "stand-up" date of 1 October 1987. On that date we did, in fact, open for business out of a small corner of the Ammunition Center building, with a staff of three: Mr. Bert Spalding, Ms. Connie Johnson, and Mr. Robert Rothenberg. It was just a couple of days later that Bert was called upon to participate in our first accident investigation, and operations have been fast and furious ever since.

Our current facilities have grown to five buildings and our staff is now 46. Mission areas address a tremendous variety of chemical and explosives related topics. The organization continues to evolve to meet the changing needs of the ammunition community and to assist soldiers and civilians in the safe performance of their chemical and explosives related duties.

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Quantity Distance (QD) Requirements for Airports and/or Heliports

The application of *ammunition/explosives* (AE) safety distances is required when airports or heliports are in close proximity to AE areas. The actual distances required between the airfield and the AE areas depend on a variety of factors. The first criteria is to determine what the airport and/or heliport is used as; e.g., a runway and/or taxiway, aircraft parking, aircraft passenger loading and/or unloading, or a combination of different uses. Who actually uses the facility, DOD or non-DOD personnel, also is required for determining correct separation distances. The other area of concern is the AE area. This area could be a storage facility, operations facility, cargo holding area, or some other type of AE use area. All these factors must be taken into account.

The DAP 385-64, Table 5-20, provides the type of separation distances required between different functions and operations of the airports and/or heliports and the AE areas.

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Static Electricity

Static electricity is produced when two unlike materials are brought into contact and then separated. When in contact, there is a redistribution of the charge across the area of contact, and an attractive force is established. When the materials are separated, work is done in overcoming these attractive forces. This work is stored as an electrostatic field, which is set up between the two surfaces when they are separated. If no conducting path is available to allow the charges to bleed off the surfaces, the voltage between the surfaces can easily reach several thousand volts as they are separated. Static electricity is an annoyance to many individuals. Static shock can result in discomfort and even injury to a worker due to involuntary reactions.

A far more dangerous aspect of static electricity is the fire and explosion hazard. This hazard can occur in situations where a vapor-air, gas-air, dust-air, or combination of these mixtures exist in the proper ratio. In order for static to be a source of ignition, four conditions must exist:

a. An effective means of static generation.

b. A means of accumulating the charges and maintaining a difference of electrical potential.

c. A spark discharge of adequate energy.

d. The spark must occur in an ignitable mixture.

The most common sources of static electricity are:

a. Steam, air, or gas flowing from any opening in a pipe or hose, particularly when the stream is wet or when the air or gas stream contains particulate matter.

b. Pulverized materials passing through chutes and pneumatic conveyors.

c. Nonconductive power or conveyor belts in motion.

d. Moving vehicles.

e. All motion involving change in relative position of contacting surfaces (usually of dissimilar substances).

Static electricity dissipation. There are three basic ways to remove static electricity:

a. The grounding method generally used to eliminate or reduce the hazard from static electricity is to provide an electrically continuous path to the earth electrode system.

(1) When all of the objects are conductive, they can be grounded by electrically connecting all parts to a common ground conductor.

(2) When deemed necessary, effective grounding must include the exterior and the contents of a container.

(3) Electrical continuity may be broken by oil on bearings, paint, or rust at any contact point. To get a continuous circuit, grounding straps should be used to bridge such locations. Equipment in contact with conductive floors or table tops is not adequately grounded and requires grounding straps.

(4) Static ground will not be made to telephone grounds; electrical conduit systems; gas, steam, water, or air lines; sprinkler system; or air terminals of lightning protection systems (LPSs) (connection to the "down conductor" of the system at the ground level is authorized).

b. Humidification. Static electricity accumulations and subsequent discharges are usually prevented if the relative humidity is above 60 percent. Where humidification techniques are used to prevent static electricity accumulations, a daily preoperational check of the humidity levels will be accomplished prior to start of work. However, certain materials such as metallic powders and some of the pyrotechnic mixtures cannot be exposed to air with 60 percent relative humidity because of the possibility of spontaneous ignition.

c. Ionization. Ionization is electrical neutralization and serves as an effective method of removing static charges from certain processes and/or operations. Methods of application can be found in NFPA Recommended Practice 77. Ionization methods of removing static charges must not be used in hazardous locations as defined in the National Electrical Code, NFPA 70.

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Site Plan Approval Made Faster

When we receive a site plan at USATCES, we make every effort to review it and forward it to Department of Defense Explosives Safety Board (DDESB) within two weeks. However, delays occasionally occur. These are caused by incomplete information, lack of necessary documentation, and oversights. Most of these things can be fixed here, but it does take time to go through channels and obtain the information. There are a number of things that you can do before you send the site plan forward that will speed up the process. These are:

a. Decide what it is that your are trying to site. For example, a loading dock. Now the loading dock can be sited at intraline distance or magazine distance. It all depends on the operation, and what it is being used for. Also, is it an operation that you are siting or storage? Remember that surveillance buildings are not storage sites and cannot use rules that apply to storage magazines.

b. Decide what limits you will request. Remember that a license is imposed locally and can be less than the sited amount. Decide whether you will in the future need more than what you are asking for and whether the site will be able to safely hold that future amount. Then ask for the limits that you have decided on. Remember to ask for all hazard class/divisions (HC/Ds) of ammunition.

c. Now you are actually ready to begin putting things down on paper. Look at your map. What are the buildings and structures that are affected by your proposed siting? Put down on paper what each of these are - to include the fact that they may only be lines on the map and no longer exist. Tell us what each of the buildings is used for. If you say that a building is a field office, then tell us the type of people who work in the building, for example, inventory personnel. If the building contains explosives, tell us what type is in the building by HC/D and amount.

d. You should have your site plan ready to send forward. Check and make sure that you have one copy for each headquarters that it goes through, and that by the time it reaches us there are still two copies of everything left. Remember, we use one and then forward a copy to the DDESB.

Remember, more thought and planning at the beginning will result in a better product and faster approval. Site plans are for the most part fairly simple. Some are more complex and may require help. If this is the case, you can call us.

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Automated Site Planning

The Army is participating with the Department of Defense Explosives Safety Board (DDESB) in development of an automated site planning system. Funding for the project is being provided by the Defense Environmental Security Corporate Information Management (DESCIM) program. This system will tie together resources and information contained in safety, logistics, and public works offices at the installation level to allow preparation of an electronic document. The package will use computer-aided design (CAD) software to plot and store information, and communications software to transmit the information electronically for review.

Funding for implementation must come from existing resources. We are providing this information now to allow for budgeting of monies at the local level.
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Explosives Licensing

The quantity distance (QD) standards of DAP 385-64 form the basis of explosives licensing. Where easements or protective zones are established beyond installation boundaries, these additional distances may be used in QD calculations. When ammunition and explosives safety standards cannot be met, facilities will not be licensed unless covered by an approved waiver or exemption.

Explosives licenses are permanent documents with no expiration date. However, a new license will be issued, and the old license canceled, if encroachment changes the determining factor or changes in QD standards require license alterations.

Explosives licenses in accordance with DAP 385-64 will be reviewed annually by the responsible safety manager/director for compliance and encroachment. The review needs to include an on-site inspection of the area and a check to see that the explosive limits established are not exceeded.

The servicing safety office is required to have on file a copy of the explosives license, and maps of the explosives locations and surrounding area. Maps need to show all structures affected and accurate distances. In accordance with DAP 385-64, the explosives license form will as a minimum, contain the following information:

a. Ammunition or explosives area location.
b. Ammunition or explosives facility location.
c. Type of facility.
d. The *hazard class/division* (HC/D) authorized.
e. Allowable limits of each HC/D (expressed in pounds or kilograms).
f. Determining factor or object, which limits the amount of ammunition or explosives in (e) above.
g. Actual separation distance between the facility in (b) above, and the determining factor in (f) above.

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HANTAVIRUS IN AMMUNITION LOCATIONS

Paragraph 3-6b of DAP 385-64 requires a regular cleaning program to ensure safety of personnel at locations where ammunition and explosives are handled and/or stored. While cleaning is not recommended during an explosives operation, cleanliness and general housekeeping of the facilities is required for the protection of material, equipment, facilities, and personnel. One of the hazards to which personnel may be exposed when cleaning facilities and storage structures is the presence of rodents, which are known to be carriers of the hantavirus disease.

The following article discusses hantavirus and provides general guidance and procedures that may be followed for the protection of personnel while cleaning storage structures and their surroundings. Information used in its preparation was obtained from publications and articles published by the Centers for Disease Control (CDC) through the internet.

A 55 year old man died of a hantavirus infection three weeks after a Sierra Nevada outing with his family in their motor home. "The doctor told us he didn't have anything wrong with his heart. They ruled that out, but didn't know what they were treating him for. One o'clock, one thirty he was gone... that quick," said his wife.

An outbreak of an unexplained illness occurred in the Southwestern part of the United States between May and June of 1993. More than a dozen people in the region, known as Four Corners (point where the states of Utah, Arizona, Colorado, and New Mexico meet), were killed by the mysterious disease. The CDC has reported that as of August 1996, 149 cases had been identified across the United States.

The disease is characterized by fever, chills, and muscular pain, followed by the abrupt onset of respiratory distress, often severe and fatal. These symptoms resembled the symptoms observed in patients with *adult respiratory distress syndrome* (ARDS), a common pattern in patients who are extremely ill from any of a variety of diseases. The new disease could not be immediately identified and was thus called *unexplained ARDS* (UARDS). Scientists from various disciplines and organizations were called to identify the disease, its responsible virus, and methods for control and prevention. They were able to identify the cause as a unique type of rodent-borne hantavirus (named for the Hantaan River in Korea where the strain was discovered years ago). CDC laboratories confirmed that the field deer mouse was the carrier of the hantavirus strain found in the Four Corners area. After this discovery, the newly recognized disease was renamed

Hantavirus Pulmonary Syndrome (HPS). It should be noted that flu-like symptoms are the first clinical signs of infection. However, it is acute respiratory failure – when the lungs drown in fluid from the circulatory system – which causes death in nearly two-thirds of the cases. These symptoms come on very quickly, over a matter of days, compared to other respiratory illnesses.

Although other small rodents can also be carriers, the common deer mouse is the primary host of the newly recognized hantavirus. The rodent is highly adaptable and is found in different habitats, including human residences in rural and semirural areas, but generally not in urban centers. Evidence of infection has also been found in pinon mice, brush mice and western chipmunks. The cotton rat in Florida, the rise rat in the southeast, and the white-footed mouse in the northeast have also been identified as carriers of the HPS.

Human infection may occur when infected saliva, urine, or excrete from the animal is inhaled as particles, or when materials contaminated by rodent excreta are disturbed, introduced into broken skin or eyes, or are ingested in contaminated food or water. Transmission may also occur as a result of being bitten by rodents. The risks of exposure to the disease are greatest when individuals work in, or frequently visit closed spaces where there is, or has been, an active rodent infestation.

Activities associated with infection may include cleaning rodent infested buildings and structures, disturbing infested areas, or visiting areas in which the rodent population has increased, as it did in the Four Corner region in 1993. Persons in potentially high-risk settings should be informed about the symptoms of the disease and be given detailed guidance on prevention measures. Enhanced precautions are warranted for their protection against the disease. A baseline serum sample, preferably drawn when these activities are initiated, should be available for all persons conducting the *clean-up of buildings with heavy rodent infestation.*

Insufficient information is available to allow general recommendations regarding risks or precautions for persons in the affected areas who work in occupations with unpredictable or incidental contact with rodents or their habitations. Workers in these jobs may enter empty buildings, storage structures, or other sites that may be, or may have been, infested with rodents. Rodent infestation can be determined by direct observation of shelves, closets, cabinets, or floors. If infestation is detected, abatement measures should be completed. Recommendations for such circumstances must be made on a case-by-case basis after the specific working environment has been assessed and environmental personnel have been consulted.

Currently, the best available approach for the hantavirus disease control and prevention is risk reduction through environmental hygiene practices to deter rodents from colonizing the work environment. Rodent control in and around the building structures will continue to be the primary prevention strategy.

Reduce nesting sites within 100 feet of the structure. When possible, place woodpiles 100 feet or more from the structure, and elevate wood at least 12 inches off the ground.

Dispose of trash and clutter.

Use spring-loaded rodent traps that will kill the rodents, using peanut butter as bait, continuously.

Prevent rodents from entering the work-place. Use steel wool or cement to seal, screen, or otherwise cover all openings that have a diameter greater than ¼ inch, as allowed by regulations.

Place metal roof flashing as a rodent barrier around the base of wooden, earthen, or cement structures up to a height of 12 inches and buried in the soil to a depth of 6 inches.

Use raised cement foundations in new constructions.

Areas with evidence of rodent infestation should be thoroughly cleaned to preclude exposure to hantavirus. Persons responsible for the cleaning should contact supporting environmental personnel for guidance. Workers who are asked to perform the clean-up, or do so as part of their work activities, should receive a thorough orientation about hantavirus transmission and should be trained to perform the required activities safely. Clean-up procedures must be performed in a manner that limits the potential for suspending dirt or dust from potentially contaminated surfaces and equipment.

Persons involved in clean-up procedures should wear coveralls (disposable if possible), rubber boots or disposable shoe covers, rubber or plastic gloves, protective goggles, and an *appropriate respiratory protection device, such as a half-mask* respirator with high efficiency particulate air (HEPA) filters. Respirators are not considered protective if facial hair interferes with the face seal, since proper fit cannot be assured.

Personal protective gear should be decontaminated upon removal. Launder potentially contaminated clothing with hot water and detergent. Machine-dry laundry on a high setting, or hang it to air-dry in the sun. If the coveralls are not disposable they should be immersed in liquid disinfectant until they can be washed. Before removing the gloves, wash gloved hands in general household disinfectant and then in soap and water. Thoroughly wash hands with soap and water after removing the gloves.

Hantaviruses have living cells that are susceptible to most general-purpose household disinfectants. A simple disinfectant, such as bleach, sprayed on dead rodents, nesting material, or their droppings will kill the virus within 30 minutes. A solution prepared by mixing 3 tablespoons of

household bleach in 1 gallon of water may be used in place of a commercial disinfectant. Avoid potentially infective waste material (including respirator filters) from clean up operations. This waste material should be double bagged in plastic bags and should then be disposed of in accordance with local requirements for infectious waste.

Spray dead rodents, nests, droppings, or other items that may have been tainted by rodents with a general-purpose disinfectant. Soak the material thoroughly, and place in a plastic bag. Traps contaminated by rodent urine or feces, or in which a rodent was captured, should be disinfected with a commercial disinfectant or bleach solution. If rodents have nested inside furniture and the nests are not accessible for decontamination, the furniture should be removed and burned.

After the above items have been removed, spray the floors with disinfectant (**DO NOT** use vacuum cleaners or sweep with brooms, which will create dust), mop floors with a solution of water, detergent, and disinfectant. Spray dirt floors with a disinfectant solution. Carpets can be effectively disinfected with common disinfectants or by commercial-grade steam cleaning or shampooing.

When clean up is complete (or when the bag is full), seal the bag and place it into a second plastic bag and seal. Contact environmental personnel for proper disposal procedures of the bagged material. Rebait and reset all sprung traps. Leave several baited spring-loaded traps inside at all times as a further precaution against rodent reinfestation. Examine the traps regularly.

This information is provided with the hope that it will help in the prevention of the hantavirus disease. It is not to be considered as regulatory in nature and its use is strictly voluntarily. If more information is desired, the supporting industrial hygienist (IH) or the CDC should be contacted.
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Safety Expert Held in Fatal Shell Explosion

Crime: Inspector for Army contractor is accused of second-degree murder after allowing live round to be sold as scrap metal to wrecking yard.

RIVERSIDE--A safety officer for an Army contractor was charged Monday with second-degree murder for allegedly allowing a live military shell to be taken from Ft. Irwin to a Fontana scrap yard, where it exploded and killed a worker.

The 105-millimeter shell was contained in several tons of scrap metal purchased by Dick's Auto Wrecking in Fontana, which had been assured that the load contained no explosives.

Authorities arrested Timothy M. Collister, 56, of Victorville, a former Air Force ordnance expert who worked as the safety and quality control officer for Allied Technology Group.

The company is under contract with the Army to clear the live-fire target ranges at the Army National Training Center at Ft. Irwin of ammunition and to then stockpile the inert ordnance at its base site, for later sale to local scrap and recycling yards that bid for it at auction.

Investigators found 54 more pieces of live shells and other ammunition at the wrecking yard, and uncovered at least three instances in which live ordnance was found stockpiled at the company's yard at Ft. Irwin awaiting sale, said Barry A. Bruins, chief investigator for the San Bernardino County district attorney's office.

The live shell exploded March 18, killing Martin Mendoza, 22, as he was attempting to dismantle it with a torch. Two employees were injured.

The explosion sparked a nine-month investigation by the district attorney's office and the Defense Department's Defense Criminal Investigative Services, as well as a federal review of military recycling procedures.

That review concluded that the military's procedures for recycling material was flawed, and criticized the military's use of independent contractors to collect and dispose of military scrap.

Collister, who was arrested Friday at his home, was being held Monday on $250,000 bail at San Bernardino County Central Jail.

According to Bruins, Collister falsely certified that he had inspected demilitarized scrap and concluded that it no longer contained explosive material.

After the March blast, explosives experts with the San Bernardino County Sheriff's Department and the Defense Department found the 54 additional pieces of live ammunition at the wrecking yard in Fontana, including 30 that were considered potentially lethal if they exploded, Bruins said.

"Numerous witnesses stated that there were many occasions in which Mr. Collister signed off loads leaving the site that were not inspected," Bruins said. "As a result, live ordnance was being transported over the highways of San Bernardino County and ultimately to Dick's yard in Fontana."

Bruins said that at Allied Technology Group's site at Ft. Irwin, where live ordnance was found, "Mr. Collister had a responsibility to recheck and reinspect the entire stockpile of scrap. Such reinspections never occurred."

A charge of second-degree murder, which carries a possible prison term of 15 years to life, can include killings that result

from an intentional act that is dangerous to human life, even though the defendant did not intend to kill, the district attorney's office said.

Richard Marca, attorney for Dick's Auto Wrecking, said Monday that his client was among many salvage companies that bid for military scrap from the Mojave Desert Army base to recycle steel, aluminum, and other metals.

"You buy in good faith, and you get a certificate from the person releasing it that the materials is free of explosives," he said. "When you buy a pile of scrap metal, there may be some inert ordnance material in it. You just buy it by the tonnage.

"In this particular purchase, representations were made that it included ordnance that was free of explosive materials and had undergone various safety procedures before it was allowed to be sold to the public," Marca said.

Tom Gorman, Times Staff Writer, published 25 Nov 97

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